

HALTON REGION PLANNING LIBRARY SYSTEM

Planning and Development Department
Regional Municipality of Halton
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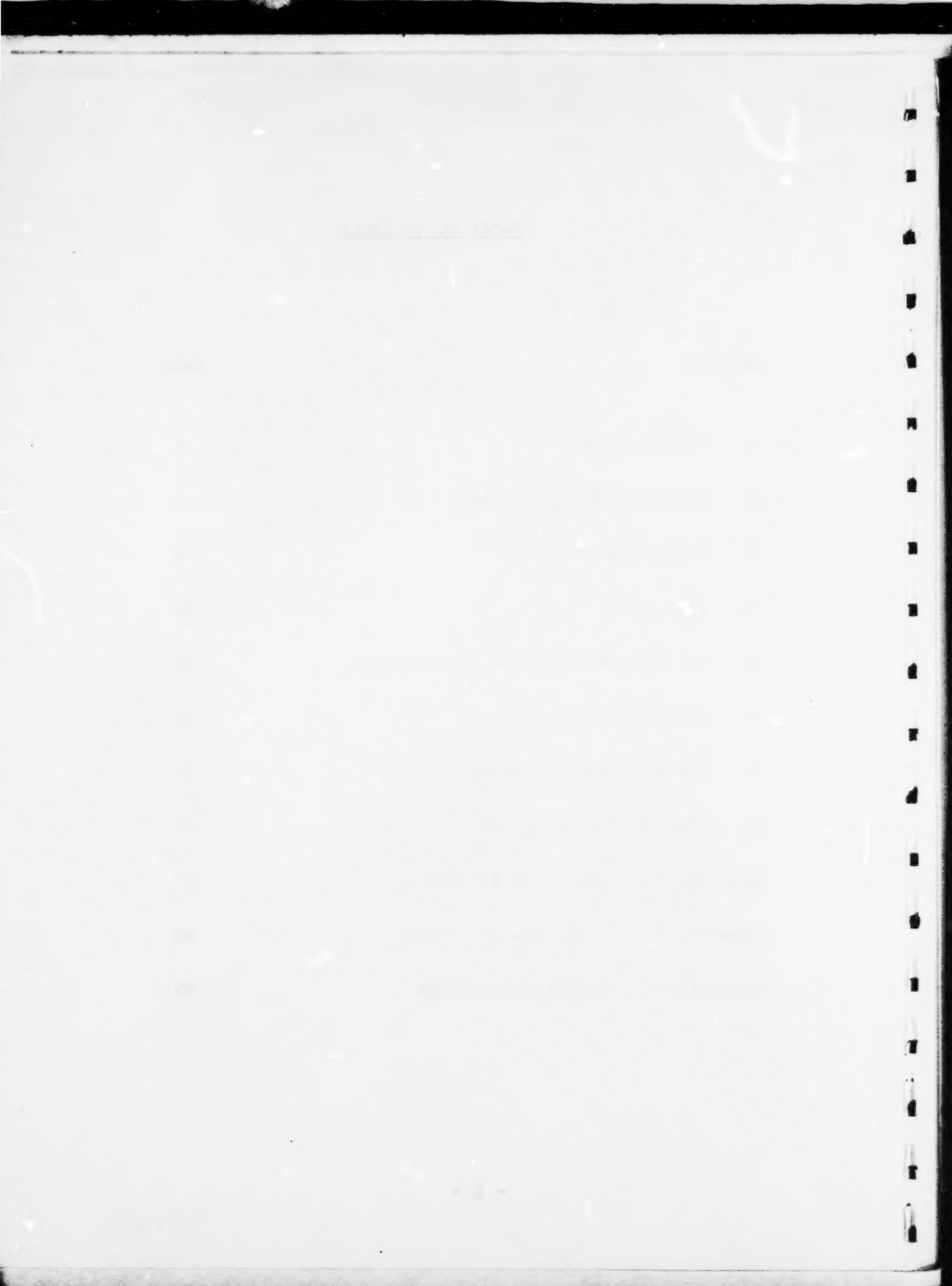
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1. INTRODUCTION

One important function of the Planning and Development Department is to conduct researches into planning issues prior to making policy recommendations. It is essential that such research activities are supported by a well organized planning library with readily available reference materials. The library should also be accessible by other departments within the Regional Corporation that are engaged in planning or research work.

During its beginning years, the Planning Department organized its reference materials through an index card system. The Department's Secretary used a subject list to code and label the documents and typed the subject number, title, author and other information onto index cards. Retrieval of library materials was therefore based on these index cards arranged by subject number. As the library grew in size, two problems soon emerged. The upkeep of the library not being one of her prime duties, the Secretary had difficulties keeping the system up to date with the large number of new entries. Secondly, and more importantly, many documents could fall into more than one subject on the subject list and it became increasingly difficult for the Secretary to keep the coding of documents consistent and accurate. A cross-referencing system was obviously needed, in order that planners and researchers could find the material they were looking for. This meant that the same information had to be duplicated on several cards: the amount of work and complexity of the system would probably be too much for a single person to handle manually and on a part-time basis.

The idea of a computer-based library system was first investigated by a research student from Sheridan College in the winter of 1980-81. With the advent of micro-computer technology and the avail of a Federal grant, a project was initiated in the spring of 1981 to develop a new planning library system for the Department. The object is simplicity--simple to use and simple to maintain; yet it should be functional, user-oriented and computer-based. Concept design was completed at an early stage and the computer programmes were written during the summer of 1981. Re-coding and data entry of some 2000 existing documents were the most time-consuming part of the project. That was not completed until the end of 1981. Further programme modifications were carried out in early 1982 to improve the efficiency of the programme.

This report will describe various aspects of the system, beginning with an overview (Section 2) and then following the logical sequence in which new documents are processed into the library (Sections 3-5). The last part (Sections 6-8) of the report deals with maintaining the library and locating materials in it. The more technical aspects of the system that are concerned with the structure of the computer programmes and data files are contained in the appendices to this report.

2. OVERVIEW OF THE SYSTEM

The planning library system would probably be best understood through a review of how new documents are processed and how the system can be used to locate desired documents.

New documents received by the Department and appropriate for the library are first coded by a planner. (The coding process is described in detail in Section 3.) When a sufficient number of new documents are accumulated (say, over the period of a month), the coded data are entered into the micro-computer. The computer programme will, based on the input information, assign to each document an identification, called the "access code", that describes the subject area of that document and the sequence within that particular subject area. This access code is unique to each document. For example, "NH014" indicates the 14th document on Heritage in the library. The computer will also print a listing of the new documents just entered (so that it can be circulated) as well as labels bearing the access codes. Once labelled, the new documents are then placed into the library according to their access codes. The processing of the new documents is complete.

Every so often, annually or semi-annually, a complete "master" listing by subject area of all documents in the library will be printed by the computer. This is equivalent to the stack of index cards in a traditional library. Users can use this master listing to scan through document titles under the subject area they are interested in. The access code will readily locate where the documents can be found on the shelf. Alternatively, they may go directly to the

shelves and leaf through those documents in their area of interest, but this would not provide the cross-referencing that is contained in the master subject listing. For instance, a report on Heritage Highways in Ontario may be filed under Transportation or Recreation (tourism) and not under Heritage. Going through the Heritage section on the library shelves will not find it but the master listing will reference it.

There is another way by which documents can be located in the library. This would be by specifying certain keywords for the computer to search through all titles that contain the keywords. Likewise, searches can be made on specific author, location or publication year--any information by which documents are coded. This type of keyword search is most useful when documents on a very specialized or multi-disciplinary subject are to be located. With this capability, the system is extremely flexible and the subject list does not have to be extensive.

The heart of the system is obviously the computer programme that performs the above mentioned functions. Another way of getting an overview of the system would be to review the "menu selection" offered by the programme when it is first started up (Figure 1). There are nine operations the programme can perform and these are described briefly below with reference to those report sections where more details are given.

1. Enter new records--this permits the entry of the coded information on new documents, one record corresponding to one document. (Sections 3 and 4)

HALTON PLANNING LIBRARY PROGRAMME.....

DATA FILE CONTAINS 2303 RECORDS: 2303 OLD AND 0 NEW ONES.

MENU: 1 = ENTER NEW RECORDS
2 = DELETE RECORDS
3 = MODIFY RECORDS
4 = UPDATE/PRINT CATEGORY FILE
5 = MERGE/PRINT NEW RECORDS
6 = PURGE DATA BANK
7 = PRINT SUBJECT LISTING
8 = SEARCH BY KEYWORDS
9 = QUIT
ENTER SELECTION?

Figure 1. Display of Menu Selection

2. Delete Records--existing records can be made "inactive" (though not physically deleted) by this operation. (Section 6)
3. Modify records--details of a documents can be corrected. (Section 6)
4. Update/print category file--the list of subject areas, called "categories", can be updated or printed (for a hard copy); in addition, this file keeps track of where documents in each subject category are located within the computer data file. (Sections 3 and 6)
5. Merge/print new records--this operation merges the new records with existing ones and provides a listing and labels of the new documents. (Section 5)
6. Purge data bank--occassionally, the data file should be ridden of "deleted" records and re-structured so that the programme can run more efficiently. (Section 6)
7. Print subject listing--the master subject listing can be printed by this function. (Section 7)
8. Search by keyword--documents can be located by specifying a keyword. (Section 8)
9. Quit--programme is terminated.

The computer programme itself and the data file structure are discussed in greater detail in the appendices.

From the above overview, one may appreciate that the library system as designed for the Planning and Development Department is quite flexible and can be easily adapted for cataloguing reference materials of other Regional departments or agencies. The system has been implemented and is operational. It therefore represents a general framework for organizing small technical reference libraries.

3. CODING DOCUMENTS

Documents for the library are coded in accordance with the coding form shown in Figure 2. There are seven items of information to be recorded.

The first item is the access code, which consists of a two-letter subject category code and a three-digit sequence number. The number is assigned automatically by the computer and need not be entered. The 68 subject categories currently in use are listed on the form for easy reference. It may be noted that this list of subject categories is a relatively short one. The idea is to use broad categories to facilitate the coding process and rely on the cross-referencing and keyword search features of the system for locating specific documents. Limited expansion (to 80 categories) of the subject category list is provided by the computer programme (see Section 6).

The next item of information to be entered on the coding form is up to three cross-reference subject codes. There are nine subject areas indicated by the first letter of the category codes. Depending on the document, the coder may enter one, two or three cross-reference subject codes, or none. The master subject listing (Section 7) will make use of these codes to produce cross-references on each of the nine subject areas.

A document may relate to a specific geographic area, which is entered as the location on the coding form. Up to ten letters are permitted. For consistency, longer location names are generally truncated, e.g. Mississauga coded as "MISSISSAUG", instead of abbreviated.

access code (see below)	☐ ☐
cross reference subjects	☐ ☐ ☐
location	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
publication year	☐ ☐
source/author	☐ ☐ ☐ ☐
large size document = X) councillors' library = Y) both = Z)	☐

[illegible]

- | | | |
|--|--|------------------------------------|
| A--Administration and Finance | D--Housing and Statistics | E--Human Services |
| AA Financial assistance | DC Census statistics | EC Children services |
| AB Finances and budgets | DD Housing design and construction | ED Education |
| AC Governments and organizations | DV Housing costs and financing | EE Elderly services |
| AI Financial impact studies | DG Housing for special groups | EF Health services |
| AZ Administration and finance--general | DI Regional information system | EI Social impact assessments |
| | DJ Housing policies and programs | EM Emergency services |
| B--Economic Activity | DK Housing research | ES Social planning |
| BA Agriculture | DL Statistics--general | EZ Human services--general |
| BC Commercial activity | DE Housing--general | |
| BF Forestry | | T--Transportation |
| BI Industrial activity | D--Government | TA Air transportation |
| BN Mineral resources | DC Conservation authorities and hazard lands | TE Transportation research |
| BR Economic research | DE Heritage | TF Canada movement |
| BU Urban development | DI Environmental impact assessments | TI Rail |
| BZ Economic activity--general | DD Open space and recreation | TL Transportation and land use |
| | DE Environmentally sensitive areas | TP Para-transit |
| | DV Waterfront | TR Roads |
| | DZ Environment--general | TS Special transportation |
| | | TT Transit |
| C--General References | F--Planning | TX Water transportation |
| CD Data processing | FC Planning consultants | TY Transportation--general |
| CE General references--general | FD Official plans and policies | |
| | FE Planning studies | U--Utilities and Services |
| | FT Planning procedures and techniques | UC Energy conservation |
| | FZ Planning--general | UD Sewage disposal |
| | | UE Electric power planning |
| | | UF Oil and gas provision |
| | | UG Solid waste management |
| | | UH Water provision |
| | | UJ Utilities and services--general |

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The fourth item to be coded is the last two digits of the year in which the document was published, e.g. "79" for 1979. This will be left blank if the year cannot be identified.

Four letters are provided on the coding form to record the source or author. The general rule is to use acronyms for agencies (e.g. "MTC" for Ministry of Transportation and Communications) and last names, truncated if necessary, for authors (e.g. "SMIT" for J.R. Smith).

It is found more practical to place oversized documents in a separate location on the shelves from the regular-size ones. For this reason, a one-letter placement code is used to so advise the user. It is also used to indicate if the document has been lodged with the Councillors' Library, or if the document is both large and located in the Councillors' Library. The master subject listings will note these exceptional placements accordingly.

The last item to be coded is the title of the document. If the title is longer than the 55 letters permitted, the following rules for coding are generally adopted: drop non-essential or non-specific words or phrases (such as the, a, report, a case study, etc.) but ensure that the title is still meaningful; avoid abbreviating words unless it is absolutely necessary and then use only very common abbreviations; and do not truncate words. These coding rules are very important as the search, a key function of the system, relies on properly spelt and functional words in the titles.

Finally, a couple of remarks on periodicals and duplicate copies of the same document. Different issues of periodicals are given the same access code so that they can be grouped together in a binder or magazine box on the library shelf. On duplicate copies, up to two copies are lodged in the library but they have the same access code. A third copy may be placed in the Councillors' Library but that document will not bear the placement code (see above) of Councillors' Library since it can be found in the main Planning Department Library.

4. DATA ENTRY

The Planning Library System was developed on a Radio Shack Model II (64K memory) micro-computer with one external disk drive. (The external disk drive, however, is not needed for most of the programme's operations.) The programming language is BASIC. It is assumed that the operator or user of the system is familiar with the basic operating procedures of the system. The following is a very brief summary of the start-up procedures (reference to the appropriate manual is recommended):

1. Connect the microcomputer to the DECwriter printer.
2. Open all disk drive doors.
3. Turn on micro-computer.
4. Turn on external disk drive.
5. Turn on printer.
6. Insert library programme diskette in Drive 0 on micro-computer.
7. Close Drive 0 door.
8. Enter date, when requested, but skip the time prompt.
9. Enter "DO DEC" to activate DECwriter printer.
10. Enter "DO IT" to get into the library programme.

When the programme is first started up, it will indicate the number of records (each record stores the coded information of one library document) in the library data file, breaking them down into old records (already in the library) and new ones (stored in the data file but not yet incorporated into the library). The selection menu is then shown (Figure 1).

After a fair number of new documents have been accumulated and coded, the coded information should be entered into the system via "menu selection 1 (enter new records)". The programme will respond with a format line indicating that the coded items are to be entered in the same order as the coding form (Figure 2). Figure 3 shows the video display of the data entry operation. At the end of each record (i.e. coded information for one document), the "enter" key should be pressed. When all records have been keyed in, the "/" sign should be entered to return to the menu. The programme allows up to 100 new records to be entered before the new records are to be merged with the old records (see Section 5). The number of new records that the programme can still accept is shown each time the "enter new records" function is invoked. In addition, when a new record is to be entered, the programme will indicate the record number for this new record, which is but a number assigned to the record sequentially within the data file. For a more technical discussion of the structure of the data file, the reader is referred to Appendix A.

Once the data of a record is entered, they can be modified through "menu selection 3", which will be discussed in Section 6.

```

MENU:  1 = ENTER NEW RECORDS
        2 = DELETE RECORDS
        3 = VERIFY RECORDS
        4 = UPDATE/PRINT CATEGORY FILE
        5 = REINDEX/PRINT NEW RECORDS
        6 = PURGE DATA BANK
        7 = PRINT SUBJECT LISTING
        8 = SEARCH BY KEYWORDS
        9 = QUIT

```

ENTER UP TO 50 NEW RECORDS ACCORDING TO INDICATED FORMAT.

TEP CANADA 79TC AN INVENTORY OF THE AUTOMOBILE NON-USED IN CANADA

AACCLLLLLLLL YSSRRR TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
IOE OAKVILLE 72OAKVXPOPULATION AND DEVELOPMENT FORECASTS

TEPMETORNTU BOMARK METRO TORONTO EMPLOYEE TRAVEL SURVEY 1990 REPORT

ACCCCLLLLLLLLLLYGGGSSU

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5. NEW DOCUMENT LISTING AND LABELS

When 100 new records (or documents) have been entered into the data file they have to be merged with the existing records so that they are grouped with other documents belonging to the same subject category. At the same time, a sequence number within the particular subject category will be assigned to that document to complete its access code (see Section 3).

To perform the merging, "menu selection 5 (merge/print new records)" should be entered from the menu.

The programme will then first read in the new records and in the process check if the subject category code is a valid one (i.e. one among the 68 shown on the coding form). If not, the user can choose to delete that record or enter the correct subject category code.

Next, the programme will sort the new records in alphabetical order of the subject category code. Information on the sorting routine is displayed on the computer (Figure 4).

Finally, the merge is performed. When it is completed, the programme will ask if a listing of the newly merged records is to be printed. It should be noted that this is the only time when such a listing is available. If the user indicates "no", the new listing will be lost and cannot be printed in future. This listing lists the new documents in the order of the access code. Figure 5 shows a sample. Such new document listings are regularly circulated to interested agencies and staff to inform them of new additions to the library.

DATA FILE CONTAINS 2307 RECORDS: 2303 OLD AND 4 NEW ONES.

MENU: 1 = ENTER NEW RECORDS
2 = DELETE RECORDS
3 = MODIFY RECORDS
4 = UPDATE/PRINT CATEGORY FILE
5 = MERGE/PRINT NEW RECORDS
6 = PURGE DATA BANK
7 = PRINT SUBJECT LISTING
8 = SEARCH BY KEYWORDS
9 = QUIT

ENTER SELECTION? 5

READING IN NEW RECORDS.....

4 RECORDS READ.

SORTING 4 NEW RECORDS BY CATEGORY CODE.....

SORT 1 (EVERY 2 ITEMS)— 3 PASSES 1 SWAPS

SORT 2 (EVERY 1 ITEMS)— 2 PASSES 1 SWAPS

SORTING COMPLETED.

MERGING NEW RECORDS.....

4 RECORDS MERGED.

WANT A PRINT OF NEWLY MERGED RECORDS (Y/N)? Y

LIST OF NEW RECORDS PRINTED.

WANT LABELS OF NEW RECORDS (Y/N)? Y

ENTER NUMBER OF LABELS/LINE, LABEL WIDTH (IN UNITS OF 1/10 INCH) AND LABEL
HEIGHT (IN UNITS OF 1/8 INCH)? 3,30,12

POSITION PRINTER HEAD. WANT A TEST RUN OF 2 LINES (Y/N)? Y

POSITION PRINTER HEAD. WANT A TEST RUN OF 2 LINES (Y/N)? N

ENTER NUMBER OF LINES (UP TO 3 LINES) TO BE PRINTED ON THIS PAGE? 3

WANT TO RE-PRINT THIS PAGE (Y/N)? N

LABELS PRINTED.

Figure 4. Display of "Merge/Print New Records" Operation

82 07 19

HALTON REGION PLANNING LIBRARY—RECENT ADDITIONS

PAGE 1

AC CODE	X REF	LOCATION	TITLE	YEAR	SOURCE	REC#
HOUSING AND STATISTICS—GENERAL (STATISTICS).....						
*HX140	E	OAKVILLE	POPULATION AND DEVELOPMENT FORECASTS	1972	OAKV	2304
PLANNING—PLANNING PROCEDURES AND TECHNIQUES.....						
PT149	N E	HALTON	AGRICULTURE RESOURCE PLANNING: STATUS REPORT	1977	RWH	2305
TRANSPORTATION—TRANSPORTATION RESEARCH.....						
TE254	P	CANADA	AN INVENTORY OF THE AUTOMOBILE NON-USER IN CANADA	1979	TC	2306
TE255	P H E	TORONTO	METRO TORONTO EMPLOYEE TRAVEL SURVEY 1980 REPORT	1980	HARK	2307

* LARGE SIZE DOCUMENT # COUNCILLORS' LIBRARY

Figure 5. New Document Listing Sample

The programme will next ask if labels for the new documents are to be printed. (Again, this is the only time when such printing is available.) If the answer is "yes", the user should insert gummed labels into the printer and indicate the label dimensions. The programme will, if requested, print a couple of lines of X's to test whether the labels are properly positioned on the printer. It will also reprint a page if it has been printed improperly. A sample is shown in Figure 6.

After printing all the labels, the programme will automatically return to the menu.

The new documents should then be affixed with the labels in the bottom left-hand corner of the cover and lodged in the appropriate place on the library shelves. This then completes the processing of new documents.

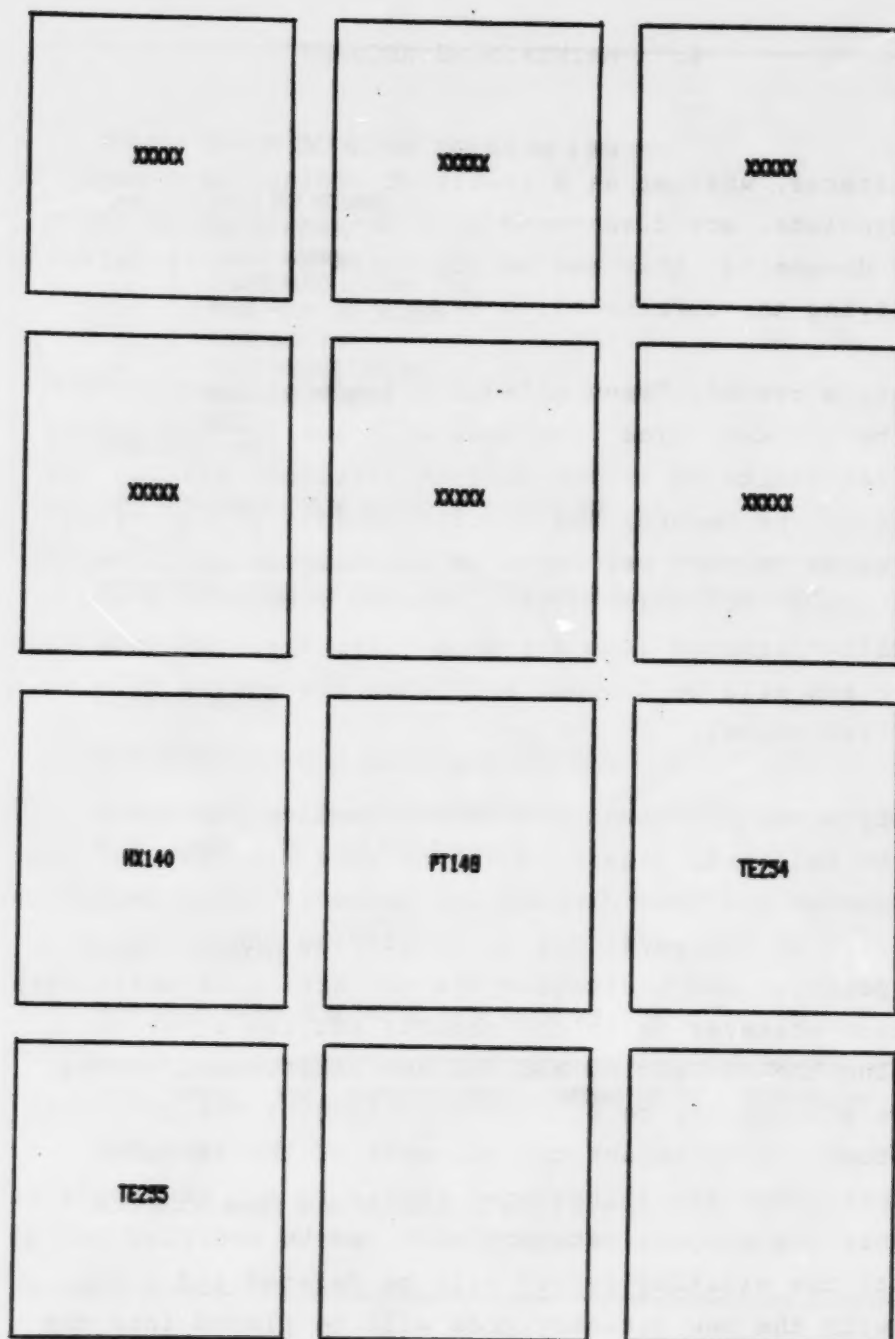


Figure 6. New Document Labels Sample

6. MAINTAINING RECORDS

When mistakes, whether as a result of coding, data entry or other problems, are discovered from the listings of the library documents, they can be corrected by either deleting or modifying the corresponding records.

To delete a record, "menu selection 2 (delete records)" should be invoked. The programme will ask for the record number (as indicated in the subject listing), display the contents of the record, and confirm if this is the right record to be deleted before it is actually deleted (Figure 7). It should be remarked that deleted records are not "physically" removed from the data file: they are only made inactive and will be dropped only when the entire file is purged (see below).

To modify a record, "menu selection 3 (modify records)" should be selected. Again, the programme will ask for the record number and then display its contents. The record can be modified in two ways: one by specifying the starting column position and indicating the new string of characters to replace whatever is in the record; and the other by indicating the old string and the new replacement string (the two strings may be different in length; the programme will automatically repack the contents of the record). These operations are illustrated in Figure 8. It should be noted that the subject category code can be modified but as a result, the existing record will be deleted and a new record with the new category code will be placed into the data file as a new record (which has then to be merged). Finally, the sequence number in the access code cannot be modified.

```

MENU: 1 = ENTER NEW RECORDS
      2 = DELETE RECORDS
      3 = MODIFY RECORDS
      4 = UPDATE/PRINT CATEGORY FILE
      5 = MERGE/PRINT NEW RECORDS
      6 = PURGE DATA BANK
      7 = PRINT SUBJECT LISTING
      8 = SEARCH BY KEYWORDS
      9 = QUIT

```

ENTER RECORD NUMBER TO BE DELETED (0 TO QUIT)? 640

DELETE (Y/N)? Y

ENTER RECORD NUMBER TO BE DELETED (0 TO QUIT)? 1327

DELETE (Y/N)? Y

ENTER RECORD NUMBER TO BE DELETED (0 TO QUIT)? 500

DELETE (Y/N)? N

ENTER RECORD NUMBER TO BE DELETED (0 TO QUIT)? 0

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```

MENU:  1 = ENTER NEW RECORDS
        2 = DELETE RECORDS
        3 = MODIFY RECORDS
        4 = UPDATE/PRINT CATEGORY FILE
        5 = MERGE/PRINT NEW RECORDS
        6 = PURGE DATA BANK
        7 = PRINT SUBJECT LISTING
        8 = SEARCH BY KEYWORDS
        9 = QUIT

```

ENTER RECORD NUMBER TO BE MODIFIED (0 TO QUIT)? 400

STARTING COLUMN POSITION (0 FOR REPLACEMENT TYPE OF CHANGE)? 63

HD114 ONTARIO 75NCER THE ONTARIO BUILDING CODE - REGULATION 952/75

ENTER RECORD NUMBER TO BE MODIFIED (0 TO QUIT)? 1001

STARTING COLUMN POSITION (0 FOR REPLACEMENT TYPE OF CHANGE)? 0

TL155PH OAKVILLE 73NCLC NIDAL SPLIT STUDY FOR SHERIDAN COLLEGE

ENTER RECORD NUMBER TO BE MODIFIED (0 TO QUIT)? 0

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Occasionally, the library data file (or bank) should be "purged" through "menu selection 6 (purge data bank)". This procedure performs two functions: to rid the data file of deleted records and to re-order the records in accordance with their subject category codes. In general, purging the data bank will reduce the overall size of the data file and make certain operations of the programme run more efficiently (i.e. in less time). Since purging the data bank will change the record number of most of the records in the data file, it should be followed by a new master subject listing (see Section 7) so that future reference to records to be deleted or modified can be made correctly. For a more detailed discussion of the data bank purge, the reader should refer to Appendix A, Data File Structure. Figure 9 displays the purge data bank operation.

There will be occasions when the 68 subject categories have to be adjusted (through additions, deletions or modifications), or the data file be re-started as a result of a critical system crash, or simply a printout of the current subject categories is needed. Such functions can be performed via "menu selection 4 (update/print category file)".

The subject category file is a computer file (separate from the library data file) used to store the subject category codes, their verbal descriptions, and three pointers--the first two being the record numbers of the starting and ending records in that subject category, and the third the last sequence number used in that category. A sample printout of the category file is shown in Figure 10. Up to 80 categories can be stored in the file.

DATA FILE CONTAINS 2307 RECORDS: 2307 OLD AND 0 NEW ONES.

MENU: 1 • ENTER NEW RECORDS
2 • DELETE RECORDS
3 • MODIFY RECORDS
4 • UPDATE/PRINT CATEGORY FILE
5 • MERGE/PRINT NEW RECORDS
6 • PURGE DATA BANK
7 • PRINT SUBJECT LISTING
8 • SEARCH BY KEYWORDS
9 • QUIT

ENTER SELECTION? 6

INSERT DISKETTE WITH SUFFICIENT STORAGE SPACE IN DRIVE 1. READY (Y/N)? Y

PROCESSING OLD RECORD 2144 WITH 2307 OLD RECORDS READ AND 2285 NEW RECORDS STORED.

NEW DATA FILE STORED AS LDATA1/DAT AND NEW CATEGORY FILE AS LIDCAT1/DAT ON
DISKETTE IN DRIVE 1. COPY OR RE-NAME THESE NEW FILES AS LDATA/DAT AND
LIDCAT/DAT BEFORE RE-STARTING PROGRAMME.

Ready

Figure 9. Display of "Purge Data Bank" Operation

HALTON REGION PLANNING LIBRARY

SUBJECT CATEGORY LISTING

(AS OF 82 07 19)

CODE	DESCRIPTION	START REC #	END REC #	LAST SEN # USED
AA	ADMINISTRATION AND FINANCE—FINANCIAL ASSISTANCE	1	5	106
AB	ADMINISTRATION AND FINANCE—FINANCES AND BUDGETS	8	47	142
AG	ADMINISTRATION AND FINANCE—GOVERNMENTS AND ORGANIZATIONS	48	2224	159
AI	ADMINISTRATION AND FINANCE—FINANCIAL IMPACT STUDIES	98	104	112
AZ	ADMINISTRATION AND FINANCE—GENERAL	105	2225	128
EA	ECONOMIC ACTIVITY—AGRICULTURE	127	158	137
EC	ECONOMIC ACTIVITY—COMMERCIAL ACTIVITY	180	2151	139
EF	ECONOMIC ACTIVITY—FORESTRY	182	2228	106
EI	ECONOMIC ACTIVITY—INDUSTRIAL ACTIVITY	186	213	121
EN	ECONOMIC ACTIVITY—MINERAL RESOURCES	214	2227	131
ER	ECONOMIC ACTIVITY—ECONOMIC RESEARCH	240	282	123
EU	ECONOMIC ACTIVITY—URBAN DEVELOPMENT	283	2158	184
EZ	ECONOMIC ACTIVITY—GENERAL	332	2180	122
GD	GENERAL REFERENCES—DATA PROCESSING	350	2162	124
GZ	GENERAL REFERENCES—GENERAL	371	2228	170
HC	HOUSING AND STATISTICS—CENSUS STATISTICS	430	2250	187
HD	HOUSING AND STATISTICS—HOUSING DESIGN & CONSTRUCTION	447	2176	119
HF	HOUSING AND STATISTICS—HOUSING COSTS AND FINANCING	484	474	111
HG	HOUSING AND STATISTICS—HOUSING FOR SPECIAL GROUPS	475	2177	120
HI	HOUSING AND STATISTICS—REGIONAL INFORMATION SYSTEM	484	486	103
HP	HOUSING AND STATISTICS—HOUSING POLICIES AND PROGRAMMES	487	527	137
HR	HOUSING AND STATISTICS—HOUSING RESEARCH	528	2178	142
HX	HOUSING AND STATISTICS—GENERAL (STATISTICS)	584	2182	138
HZ	HOUSING AND STATISTICS—GENERAL (HOUSING)	587	2183	134
IC	ENVIRONMENT—CONSERVATION AUTHORITIES AND HAZARD LANDS	618	2186	138
IH	ENVIRONMENT—HERITAGE	652	659	108
II	ENVIRONMENT—ENVIRONMENTAL IMPACT ASSESSMENTS	680	2281	167
IO	ENVIRONMENT—OPEN SPACE AND RECREATION	707	2182	142
IS	ENVIRONMENT—ENVIRONMENTALLY SENSITIVE AREAS	745	2185	131
IU	ENVIRONMENT—WATERFRONT	788	2186	181
IZ	ENVIRONMENT—GENERAL	843	2283	211
PC	PLANNING—PLANNING CONSULTANTS	944	2284	127
PP	PLANNING—OFFICIAL PLANS AND POLICIES	971	2200	282
PS	PLANNING—PLANNING STUDIES	1127	1176	178
PT	PLANNING—PLANNING PROCEDURES AND TECHNIQUES	1177	1223	148
PZ	PLANNING—GENERAL	1224	2285	154
SC	HUMAN SERVICES—CHILDREN SERVICES	1270	2203	148
SD	HUMAN SERVICES—EDUCATION	1315	2286	107

Figure 10. Subject Category File Listing Sample

SE	HUMAN SERVICES—ELDERLY SERVICES	1320	1327	108
SH	HUMAN SERVICES—HEALTH SERVICES	1328	2205	113
SI	HUMAN SERVICES—SOCIAL IMPACT ASSESSMENTS	1338	1340	103
SN	HUMAN SERVICES—EMERGENCY SERVICES	1341	1342	102
SS	HUMAN SERVICES—SOCIAL PLANNING	1343	1358	118
SZ	HUMAN SERVICES—GENERAL	1358	1381	133
TA	TRANSPORTATION—AIR TRANSPORTATION	1382	1388	105
TE	TRANSPORTATION—TRANSPORTATION RESEARCH	1387	2287	253
TG	TRANSPORTATION—GOODS MOVEMENT	1524	1542	121
TI	TRANSPORTATION—RAIL	1543	1580	120
TL	TRANSPORTATION—TRANSPORTATION AND LAND USE	1581	1841	212
TP	TRANSPORTATION—PARA-TRANSIT	1842	1882	144
TR	TRANSPORTATION—ROADS	1883	2289	233
TS	TRANSPORTATION—SPECIAL TRANSPORTATION	1780	1810	138
TT	TRANSPORTATION—TRANSIT	1811	2301	210
TM	TRANSPORTATION—WATER TRANSPORTATION	0	0	100
TZ	TRANSPORTATION—GENERAL	1901	2214	133
UC	UTILITIES AND SERVICES—ENERGY CONSERVATION	1831	2221	153
UD	UTILITIES AND SERVICES—SEWAGE DISPOSAL	1971	2302	159
UE	UTILITIES AND SERVICES—ELECTRIC POWER PLANNING	2020	2303	144
UD	UTILITIES AND SERVICES—OIL AND GAS PROVISION	0	0	100
US	UTILITIES AND SERVICES—SOLID WASTE MANAGEMENT	2083	2222	168
UM	UTILITIES AND SERVICES—WATER PROVISION	2115	2135	123
UZ	UTILITIES AND SERVICES—GENERAL	2138	2223	134

Figure 10. Subject Category File Listing Sample (continued)

The "update/print category file" function contains a sub-menu whereby the user can choose to add, delete, modify, re-create, or print the subject categories (Figure 11). It should be noted that deleting a category will also delete all data file records that belong to that category. The category code itself cannot be modified, only its description can. To re-create the pointers of the categories, the old records in the data file have to be sorted by access code first (by means of a couple of utility programmes, as described in Appendix B). An error message will be displayed and the procedure terminated if the data file's old records are out of sequence. During the re-creation, the subject category code in each record is also checked for its validity.

DATA FILE CONTAINS 2307 RECORDS: 2303 OLD AND 4 NEW ONES.

MENU: 1 = ENTER NEW RECORDS
2 = DELETE RECORDS
3 = MODIFY RECORDS
4 = UPDATE/PRINT CATEGORY FILE
5 = MERGE/PRINT NEW RECORDS
6 = PURGE DATA BANK
7 = PRINT SUBJECT LISTING
8 = SEARCH BY KEYWORDS
9 = QUIT

ENTER SELECTION? 4

CATEGORY FILE CONTAINS 62 SUBJECT CATEGORIES.

WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/N/R/P/Q)? P

CATEGORY LISTING PRINTED.

CATEGORY FILE CONTAINS 62 SUBJECT CATEGORIES.

WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/N/R/P/Q)? D

ENTER CATEGORY CODE TO BE DELETED (/ TO EXIT)? 52

CATEGORY CONTAINS 33 RECORDS WHICH WILL BE DELETED AS WELL. DELETE (Y/N)? Y

CATEGORY 52 DELETED.

ENTER CATEGORY CODE TO BE DELETED (/ TO EXIT)? /

CATEGORY FILE CONTAINS 61 SUBJECT CATEGORIES.

WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/N/R/P/Q)? A

ENTER NEW CATEGORY CODE AND DESCRIPTION ACCORDING TO INDICATED FORMAT.

CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC (ENTER / TO QUIT)
SALVAGE SERVICES—WELFARE

CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC (ENTER / TO QUIT)
/

Figure 11. Display of "Update/Print Category" Operation

CATEGORY FILE CONTAINS 62 SUBJECT CATEGORIES.

WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/N/R/P/Q)? H

ENTER CATEGORY CODE OF DESCRIPTION TO BE MODIFIED (/ TO EXIT)? U0

NEW DESCRIPTION IN QUOTES? "UTILITIES AND SERVICES—PETROLEUM AND GAS"

ENTER CATEGORY CODE OF DESCRIPTION TO BE MODIFIED (/ TO EXIT)? U0

NEW DESCRIPTION IN QUOTES? "UTILITIES AND SERVICES—PETROLEUM AND GAS PROVISION"

ENTER CATEGORY CODE OF DESCRIPTION TO BE MODIFIED (/ TO EXIT)? /

CATEGORY FILE CONTAINS 62 SUBJECT CATEGORIES.

WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/N/R/P/Q)? R

DATA FILE MUST BE SORTED BY THE OLD RECORDS. READY (Y/N)? Y

SCANNING RECORD 2303

CATEGORY FILE RE-CREATED AND DATA FILE UPDATED.

CATEGORY FILE CONTAINS 62 SUBJECT CATEGORIES.

WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/N/R/P/Q)? Q

CATEGORY FILE CONTAINS 62 SUBJECT CATEGORIES.

Figure 11. Display of "Update/Print Category" Operation (continued)

7. MASTER SUBJECT LISTING

The master subject listing is equivalent to the subject index card file of a conventional library and should be produced when there are a good number of new additions to the library since the previous listing. At the current rate of addition to the planning library, it is expected that the subject listing will be updated every six months or so.

The master subject listing is produced by selecting "menu selection 7 (print subject listing)". The programme will start listing all documents in each of the subject categories in the categories' alphabetical order. In addition, at the end of each subject (indicated by the first letter of the category code), all cross-reference materials under that subject will be printed in the sequence of the access code. A sample printout of such a cross-reference listing is shown in Figure 12.

Should the printing of the subject listing be interrupted for whatever reason (system crash, paper adjustment, out of ribbon, etc.), the listing can be resumed by indicating to the programme the last page number and the last record number printed, and whether the last record is part of a cross-reference listing. Figure 13 shows this feature.

Since the master subject listing is a complete list of all documents in the library, it is published and circulated whenever a new listing is prepared. Further, a copy of it can be used to manually keep track of materials being loaned out (to whom and on what date) and returned (on what date). Another or the same copy can also be marked up with corrections due to spelling mistakes or coding inaccuracies that have to be made before the next master listing is to be printed.

*** ADMINISTRATION AND FINANCE—CROSS REFERENCE ***

AC CODE	X REF	LOCATION	TITLE	YEAR	SOURCE	REC#
EC101	A	DURHAM	BUSINESS INDUSTRY - DURHAM REGION		RND	180
EC108	A P	TORONTO	TORONTO REGION STRIP RETAIL AREAS & SHOPPING CENTRES 78	1976	HTPD	164
EC110	A	HALTON	DRAFT ECONOMIC STRATEGY "INTO THE EIGHTIES"	1980	RWH	168
EC117	A P	OKVILLE	SECTIONS 1 & 2 RETAIL MARKET STUDY OKVILLE	1977	CTO	173
EI102	A G	ONTARIO	BUILDING ONTARIO IN THE 1980'S	1981		187
EU116	A N P	BRAHPTON	FINANCIAL, ENVIRONMENTAL IMPACT STUDY URBAN GROWTH	1975	URNI	273
EU117	A G	HAMILTON	SKYLINE, HAMILTON-MENTHORTH	1973	RWH	274
EU143	A P	PEEL	REGIONAL IDENTITY: ROLES & FUNCTIONS - URBAN CENTRES	1977	RWP	297
EU162	A	OKVILLE	APPLICATIONS FOR EXPANSION OF AREA OF DEVELOPMENT	1975	OKV	314
EZ101	A G	HAMILTON	ECONOMIC FINANCIAL SURVEY, HAMILTON-MENTHORTH	1975	RWH	332
EZ102	A I	PEEL	ECONOMIC/EMPLOYMENT SUPPLEMENT STUDY	1976	RWP	333
EZ104	A	HALTON	AN ECONOMIC AND FINANCIAL SURVEY, HALTON	1974	RWH	334
EZ108	P A	GERMANY	REGIONAL DEVELOPMENT PLAN - RUHR DISTRICT	1968	HOSS	338
EZ110	A	CANADA	TOMORROW'S CAPITAL REGIONAL PLANNING CONCEPT	1974	NCC	338
GZ117	A	ONTARIO	METRIC CONVERSION PROJECT ACTIVITY CHECKLIST		HTC	385
GZ141	H P A	ONTARIO	PROJECT UPDATE PERIODICAL - MAJOR CURRENT PROJECTS		RWH	408
HI101	A	HALTON	HANUAL OF THE REGIONAL INFORMATION SYSTEM		RWH	484
HR117	A	CANADA	HOUSING MANAGEMENT PROBLEMS IN CANADA	1981	CWC	540
HX120	A E G	ONTARIO	CATALOGUE OF STATISTICAL FILES ONTARIO GOVERNMENT	1974	TEIA	581
4HX122	A	HALTON	HALTON CAPITAL BUDGET & FORECAST POPULATION FORECASTS	1980	RWH	583
HZ102	A	CANADA	CANADA MORTGAGE AND HOUSING CORPORATION ANNUAL REPORT	1980	CWC	597
HI118	A	ONTARIO	ENVIRONMENTAL ASSESSMENT ACT AND MUNICIPALITIES	1977	NCE	668
NS118	P A	ONTARIO	GOVERNMENT POLICY FOR THE NIAGARA ESCARPMENT	1973	TEIA	758
HM161	A	TORONTO	ONTARIO REGULATION 735/73 SCHEDULE 9 (WATERFRONT)		HTCA	827
HZ103	A	ALBERTA	ADMINISTRATION & REGULATION OF NOISE IN ALBERTA	1980	ECOA	847
HZ167	A	ONTARIO	WHO WE ARE, WHAT WE ARE DOING FOR YOU MINISTRY NAT. RES		HR	903
PP108	A	GREY/ONEH	ADMINISTRATION-RESEARCH REPORT #4	1971		977
PP112	A H	MANITOBA	PROVINCIAL LAND USE POLICIES-MANITOBA-1980	1980	MHT	978
PT105	N A	ONTARIO	COSTS & BENEFITS-ENVIRONMENTAL PLANNING PRACTICES	1979	PCI	1180
PT114	A	WATERLOO	DEPARTMENTAL PROCEDURES - DEVELOPMENT CONTROL APPLICA.	1975	RWH	1188
PT130	A	HALTON	CATALOGUE - TITLES OF POLICIES, ACTIONS & ENDORSEMENTS	1978	RWH	1205
PZ103	A	ONTARIO	PROGRAM PLANNING IN MUNICIPALITIES	1970		1224
PZ108	A E	ONTARIO	SUBJECT TO APPROVAL - MUNICIPAL PLANNING REVIEW	1973	OEC	1228
SS107	A	TORONTO	INVENTORY OF EMERGING COMMUNITY SERVICES APPENDIX II	1976	SPC	1347
SS108	A	TORONTO	TRENDS - COMMUNITY SERVICE BACKGROUND REPORT	1976	SPC	1348
TT2018	A	TORONTO	TORONTO AREA TRANSIT FINANCIAL STATEMENTS & REPORT	1981	TATO	1885
TZ118	A	MONTREAL	COST CHARGING FOR INTER-MUNICIPAL TRANSIT - SUMMARY	1979	FORT	1918
UC102	H A	BURLINGTON	ENERGY CONSERVATION AUDIT OF MUNICIPAL BUILDINGS	1979	CCB	1932
UC108	A	USA	CAPACITY BUILDING LOCAL APPROACHES TO ENERGY CONSERVATI	1974	HUD	1935
UD101	A E	OKVILLE	MASTER SERVICING AND FINANCE SCHEME FOR OKVILLE DRAFT	1981	CLRR	1971
UD124	P A	DURHAM	LOT LEVIES/USER RATES-SEWER, WATER, ROADS, SOLID WASTE	1980	RND	1988
UE102	A	HALTON	HALTON STUDY TEAM ELECTRIC UTILITIES LOCAL TEAM REPORT	1979	PUC	2021
UE103	A	HALTON	ELECTRICAL UTILITY RESTRUCTURING IN HALTON RESOURCE REP	1979	PUC	2022

* LARGE SIZE DOCUMENT

* COUNCILLORS' LIBRARY

Figure 12. Cross-reference Subject Listing Sample

DATA FILE CONTAINS 2307 RECORDS: 2307 OLD AND 0 NEW ONES.

MENU: 1 = ENTER NEW RECORDS
2 = DELETE RECORDS
3 = MODIFY RECORDS
4 = UPDATE/PRINT CATEGORY FILE
5 = MERGE/PRINT NEW RECORDS
6 = PURGE DATA BANK
7 = PRINT SUBJECT LISTING
8 = SEARCH BY KEYWORDS
9 = QUIT

ENTER SELECTION? 7

RESUME AN INTERRUPTED LISTING (Y/N)? Y

ENTER LAST PAGE NUMBER AND LAST RECORD NUMBER PRINTED? 12,239

IS THE LAST RECORD PRINTED IN A CROSS-REFERENCE BLOCK (Y/N)? N

SUBJECT LISTING PRINTED.

Figure 13. Display of "Print Subject Listing" Operation

8. LOOKING FOR DOCUMENTS

Obviously, the place to start looking for specific documents or titles in the library is the master subject listing. The user should first select from the 68 subject categories (as listed in the table of contents of the subject listing) one or more categories that his subject of interest is most likely to fall under. He can then scan through those parts of the listing and locate the particular documents he would like to examine. The materials can of course be retrieved from the library by means of the access code.

In making use of the master subject listing, the user should also look under the cross-reference listing for the titles he is interested in. The documents may not appear under one specific category code but may show up in the cross-reference listing for the associated subject code.

Specific documents can also be located in the library by asking the computer to scan through all records stored in the library data file for matching keywords. This is done by invoking "menu selection 8 (search by keywords)". Up to five keywords can be entered, which will be used in the same search. All documents bearing one or more of the keywords will be listed either on the video display or printed on the printer. The keywords may appear in any of the coded elements of the record (location, title, source, or even the year code). The user also has the option of starting the scan from the beginning of the data file or from a particular subject category. The search operation as displayed on the computer is illustrated in Figure 14, while a sample of the search listing is shown in Figure 15.

DATA FILE CONTAINS 2307 RECORDS: 2307 OLD AND 0 NEW ONES.

MENU: 1 = ENTER NEW RECORDS
2 = DELETE RECORDS
3 = MODIFY RECORDS
4 = UPDATE/PRINT CATEGORY FILE
5 = MERGE/PRINT NEW RECORDS
6 = PURGE DATA BANK
7 = PRINT SUBJECT LISTING
8 = SEARCH BY KEYWORDS
9 = QUIT

ENTER SELECTION? 8

ENTER UP TO 5 SEARCH STRINGS SEPARATED BY / (ENTER // TO QUIT)?
ACTON/LAND USE/BUS /TAXI

SEARCH FROM BEGINNING OF DATA FILE (Y/N)? Y

DISPLAY OR PRINT SEARCHED RECORDS (D/P)? P

SEARCH BEGINS.....(TO INTERRUPT, HOLD DOWN ANY KEY)

.....SCANNING RECORD 2144 CATEGORY UZ AND 2307 RECORDS SCANNED

SEARCH COMPLETED WITH 114 RECORDS IDENTIFIED.

Figure 14. Display of "Search by Keywords" Operation

AC CODE	X REF	LOCATION	TITLE	YEAR	SOURCE	RECH
EA121		ONTARIO	LAND USE CAPABILITY FOR AGRICULTURE BY TOWNSHIPS ARDA	1970	DAF	143
*EC1359		H HILLS	ACTON/GEORGETOWN BUSINESS IMPROVEMENT PART 1 CORE AREA	1981	WALK	188
*EC1388		H HILLS	PART 2A: BUSINESS IMPROVEMENT AREA PLAN FOR ACTON	1981	WALK	188
EU108	P	HALTON	HALTON HILLS-ACTON URBAN AREA REVIEW STUDY PROPOSAL	1980	REIN	269
EU127	P	ACTON	HALTON HILLS (ACTON) URBAN AREA REVIEW PROPOSAL	1980	MMNI	282
EU151	H	BRAVPTON	REPORT 87 RURAL LAND USE SURVEY FINANCIAL & ENVIRONMENT	1975	BRAN	305
GZ106	E H	ONTARIO	LAND USE CLASSIFICATION SYSTEM SIMILIGRAPHY REFERENCES	1973	TEIF	374
GZ112	P H H	USA	LAND USE CONTROLS ANNUAL 1972	1972	ASPO	380
HZ108	P	ONTARIO	PREDICTING LAND USE TRENDS - SINCE & BUFFERIN	1971	ARDA	602
NC134	P	GRAND RIVE	EXISTING AND FUTURE LAND USE ACTIVITIES	1981	GRCA	650
NI117		BC	TOWARDS A LAND USE MANAGEMENT PHILOSOPHY IN B.C.	1976	UBC	668
NI122		GREAT LAKE	POLLUTION IN GREAT LAKES BASIN - LAND USE ACTIVITIES	1980	IJC	789
NZ176	P	CANADA	LAND DIRECTORATE - ISSUES IN CANADIAN LAND USE NO. 9	1980	EC	911
NZ177	G T	ONTARIO	ACOUSTICS TECHNOLOGY IN LAND USE PLANNING VOL 2	1978	NDE	912
NZ207	P	CANADA	ECOLOGICAL APPROACHES TO LAND USE PLANNING	1978	VEIT	942
PP112	A H	MANITOBA	PROVINCIAL LAND USE POLICIES-MANITOBA-1980	1980	NHT	978
PP141	E	ACTON	HALTON HILLS (ACTON) URBAN AREA REVIEW STUDY PROPOSAL	1980	PHIL	984
PP202		ONTARIO	LAND USE PLANNING IN THE NIAGARA REGION	1976	JACK	1053
PP236		QUEBEC	CHAPTER 31 ACT RESPECTING LAND USE PLANNING & DEVELOP	1979	GDB	1084
PP2818	U G	HALTON	ACTON URBAN AREA PROPOSED AMENDMENT NO3 OFFICIAL PLAN	1982	RWH	2199
PS135	E	ACTON	STAGE 1 HALTON HILLS (ACTON) URBAN AREA REVIEW	1980	RWH	1137
PS144	E	TORONTO	ACTON EAST STUDY 1973	1973	RMAA	1144
PS146	E	ONTARIO	THE LAND USE GROUP SOCIO-ECONOMIC LAND USE DATA		NOTC	1146
PS153	E	ACTON	CONCEPTUAL PLAN - TOWN OF ACTON	1988	PPA	1154
PS188		SCARBOROUGH	SCARBOROUGH TOWN CENTRE LAND USE STUDY	1974	SCAR	1167
PS173		ONTARIO	HALTON FARMERS' OPINIONS OF LAND USE PLANNING	1975	STAN	1171
*PS176		HALTON	RURAL EXISTING LAND USE - HALTON	1974	RWH	1174
PT104	H U	USA	PLANNING ADVISORY SERVICE: ENERGY-EFFICIENT LAND USE	1979	APA	1179
PT112	E	CANADA	LAND USE CLASSIFICATION SYSTEMS: AN OVERVIEW	1981	ENVI	1187
PT115		ONTARIO	LAW SOCIETY OF UPPER CANADA LECTURES LAND USE & DEVELOP	1974	LSUC	1190
PT120	H	ONTARIO	EXTRACT - PROVINCIAL LAND USE CLASSIFICATION SYSTEM			1195
PT122		HALTON	URBAN LAND USE QUANTIFICATION & DENSITIES	1974	RWH	1197
PT123		GREY-OWEN	RESEARCH REPORT 5 - LAND USE SURVEY & REVIEW OF SERVICE		PHIL	1198
PT126	E	ONTARIO	URBAN LAND USE IN ONTARIO AREAS & INTENSITIES		DNA	1201
PT139		USA	STREAMLINING LAND USE REGULATION	1980	APA	1214
PT140		ONTARIO	PROCEEDINGS - WORKSHOP ON LAND USE MODELS	1971	UDN	1215
PT141		ONTARIO	ONTARIO LAND USE CLASSIFICATION ACTIVITY & STRUCTURE	1974	TEIA	1218
PT142	E	CANADA	FARM-GENERATED DETERMINANTS LAND USE CHANGES 1961-75	1976	BRYA	1217
PZ107		USA	STREAMLINING LAND USE REGULATION	1980	BNLD	1227
PZ140		TORONTO	ALTERNATIVE LAND USE FUTURES METRO TORONTO	1971	HARP	1258
PZ148	G	CANADA	LAND USE CLASSIFICATION FOR LAND USE MONITORING	1981	ENVI	1266
TE118	P	OTTAWA	OTTAWA RIVER PARKWAY, CONTRA FLOW BUS LANES	1979	TC	1411
TE131	U	TORONTO	LAND USE, TRANSPORTATION AND ENERGY RELATIONSHIPS	1980	NTC	1418
TE146	U	TORONTO	LAKEHORE BUS ROUTES STUDY TORONTO-HAMILTON SUMMARY	1980	MMRS	1433
TE180	H	S. ONTARIO	GO TRANSIT, BUS PASSENGER SURVEY RIDERSHIP PATTERNS	1976	NTC	1467
TL133	P	TORONTO	JOINT PROGRAM IN TRANSPORTATION RURAL LAND USE	1972	FOUN	1584

* LARGE SIZE DOCUMENT

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Figure 15. Search Listing Sample

A couple of words on using keywords. They should not be words of such common use that they appear on many documents and result in a long search listing that is practically useless. On the other hand, the keywords should not be overly specific so as to exclude closely related words. For instance, the keyword "communities" will exclude its singular form "community"; instead the keyword string which is actually not a word, "communit" should be used. The search operation is purely mechanical; the computer only looks for matching strings of letters and the user should use his imagination to specify the most appropriate keywords or keyword strings.

APPENDIX A. DATA FILE STRUCTURE

There are two data files involved in the Halton Region Planning Library System: the library data file (LDATA/DAT) containing the document records, and the subject category file (LIBCAT/DAT) containing the category details and pointers. Both are direct access files.

Each record on LDATA/DAT is 82 bytes long and its contents are detailed in Figure A1. The first 80 bytes contain basically the coded information for each document as described in Section 3. The last two bytes are used as a next-record pointer indicating the record number of the record that follows in the order of the access code.

When new records are entered, the sequence number is set at "100" and the next record pointer at "0". The new records are placed at the end of the data file and they are distinguished from old ones by this unique sequence number of "100". During the merge, the new records are first sorted by the category code and then "inserted" into the old records by setting the next-record pointer on the preceding old record to point at the new one and transferring the original pointer from the old record to the new one. At the same time, a corresponding sequence number (starting at 101) is assigned to the new record. In other words, the records in the data file are not physically in sequential order of the access code but they are connected and ordered through the next-record pointer. There is, therefore, no displacement of old records as a result of the merge. The sequentially last record has its pointer set at "9999".

<u>Start</u> <u>Byte</u>	<u>End</u> <u>Byte</u>	<u>Byte</u> <u>Length</u>	<u>Data</u> <u>Description</u>	<u>Data</u> <u>Type</u>
1	2	2	Subject category code	String
3	5	3	Sequence number	String
6	8	3	Cross-reference subject code	String
9	18	10	Location	String
19	20	2	Year (last 2 digits)	String
21	24	4	Source/author	String
25	25	1	Placement code	String
26	80	55	Document title	String
81	82	1	Next-record pointer	Integer

Figure A1. Contents of Library Data File

Records are "deleted" from the data file by blanking out the category code. The programme is written to ignore all records with blank category code.

During the purge of the data bank, these "deleted" records with blank category code are dropped, and all other records are transferred to a temporary data file (LDATE1/DAT) on a second disk drive in the order of the access code. This, of course, is accomplished by using the next-record pointer. New records are transferred as well but without any re-ordering. As a result, most of the records from the unpurged data bank will occupy new positions, and hence have different record number in the purged bank. The new data file should be renamed LDATE/DAT before the programme is re-started.

The subject category file (LIBDAT/DAT) keeps track of the current order of the library data file by containing, apart from the category codes and their verbal descriptions, a start-record pointer, an end-record pointer, and a last-used sequence number (Figure A2) for each category. Initially, the first two pointers are set to "0" and the third at "100". When the programme is started up, the category file is read into the memory. As new records are "inserted" into existing ones, the programme makes use of the end-record pointer to pick up that record which next-record pointer has to be adjusted (see above). It also assigns a sequence number to the new record by means of the last-used sequence number, which is then incremented by one.

When the data bank is purged, the category pointers are re-generated to reflect the order of the data records in the new data bank. A corresponding new category file is stored as LIBCAT1/DAT and has to be renamed back to LIBCAT/DAT before the programme is re-started.

<u>Start</u> <u>Byte</u>	<u>End</u> <u>Byte</u>	<u>Byte</u> <u>Length</u>	<u>Data</u> <u>Description</u>	<u>Data</u> <u>Type</u>
1	2	2	Subject category code	String
3	62	60	Subject category description	String
63	64	2	Start record number	Integer
65	66	2	End record number	Integer
67	68	2	Last sequence number used	Integer

Figure A2. Contents of Subject Category File

When additions and deletions are made to the categories themselves, the category records are moved about to receive the new categories or to close gaps from deletions. Whenever the information on the categories is altered as a result of such changes or of merging new data records, the category file (LIBCAT/DAT) is updated by writing the new information from memory to disk.

Should the system crash in such a manner that the category file information no longer reflects the order of the data file, then the category file has to be re-created. To do this the data file has to be sorted by the access code on the old records (new records can remain at the end of the file). The programme can then re-set the pointers in the category file as well as the next-record pointers in the data records. The sorting can be accomplished with a couple of utility programmes as described in Appendix B.

It is always a good idea to keep one or more backup versions of both the current data file and the corresponding category file.

APPENDIX B. PROGRAMME STRUCTURE

The Halton Region Planning Library System programme (LIBRARY/BAS) is written in Radio Shack Model II interpreter BASIC. It is menu-driven with the initialization module followed by nine modules to handle each of the nine menu selections, namely:

1. Enter new records,
2. Delete records,
3. Modify records,
4. Update/print category file,
5. Merge/print new records,
6. Purge data bank,
7. Print subject listing,
8. Search by keywords, and
9. Quit.

In addition, there are four subroutines to perform some repetitive functions:

1. Update category file (from memory to disk),
2. Print footer of listing,
3. Print header of listing, and

4. Print record.

The programme listing, which is self-documenting, is contained in Appendix C.

Two utility programmes may be needed for sorting the data file (LDATA/DAT) in the event of a system crash and the category file (LIBDAT/DAT) has to be re-created. These are ZSORT/BAS and ZMERGE/BAS, also written in interpretive BASIC. The former is used to sort up to a certain number (around 330 in the case of library data) of records, as permitted by available memory, while the latter can be used to merge sorted data banks together. The listings of these two programmes are contained in Appendix C and are also self-documenting.

A disk directory of the relevant files needed to operate the library system is shown in Figure A3.

DISK NAME:DISK025			DRIVE:0		06/04/82		02.49.56			
FILE NAME	CREATED	UPDATED	ATTR	FILE REC	NUMBR	NUMBR	GRAN	SECT	SECT	
	MM DD YY	MM DD YY		TYPE LEN	RECS	EXTS	ALOC	ALOC	USED	
LIBRARY/BAS	9 14 81	7 19 82	D=XO	F 256	58	2	12	60	58	
LDATA/DAT	3 26 82	8 3 82	D=XO	F 82	2303	7	148	740	738	
IT	3 10 82	3 10 82	D=XO	F 1	24	1	1	5	1	
DEC	3 18 82	3 18 82	D=XO	F 1	29	1	1	5	1	
ZSORT/BAS	8 4 82	8 4 82	D=XO	F 256	7	1	2	10	7	
LISCAT/DAT	9 22 81	8 3 82	D=XO	F 68	80	2	5	25	21	
UNDEC	3 18 82	3 18 82	D=XO	F 1	30	1	1	5	1	
ZMERGE/BAS	8 4 82	8 4 82	D=XO	F 256	6	1	2	10	6	
** 115 FREE GRANULES IN 2 EXTENTS **										

Figure A3. Disk Directory of Programme and Data Files

APPENDIX C. PROGRAMME LISTINGS

This appendix contains the listings of three programs: LIBRARY/DAT, ZSORT/BAS, and ZMERGE/BAS, which are discussed in Appendix B. These listings contain notes describing the function of each programme parts and are therefore self-documenting.

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10 REM-----LIBRARY/BAS-----written by h k wong-----version 6-----82 05 25
20 REM-----halton planning library programme
30 REM-----initialize
40 DEFINT A-Z
50 CLS
60 CLEAR 13000
70 DIM CC$(80),CD$(80),SR$(80),ER$(80),LT$(80),NW$(80),RR$(100)
80 DT$=MID$(DATE$,11,2)+ " "+MID$(DATE$,16,2)+ " "+MID$(DATE$,7,2)
90 IF MID$(DT$,4,1)= " " THEN MID$(DT$,4,1)="0":IF MID$(DT$,7,1)= " " THEN MID$(DT$,7,1)="0"
100 R$=CHR$(26):S$=CHR$(25)
110 PRINT "HALTON PLANNING LIBRARY PROGRAMME.....":PRINT
120 OPEN "D",1,"DATA/DAT",82
130 FIELD 1,80 AS R1$,2 AS N1$
140 IF LOF(1)=0 THEN I=1:GOTO 170
150 FOR I=1 TO LOF(1):GET 1,LOF(1)-I+1:IF MID$(R1$,3,3)<>"100" THEN 170
160 NEXT I
170 LR=LOF(1)-I+1:NW=I-1:RD=0
180 PRINT "DATA FILE CONTAINS";LOF(1);"RECORDS:";LR;"OLD AND";NW;"NEW ONES.":PRINT
190 PRINT "MENU: 1 = ENTER NEW RECORDS"
200 PRINT "      2 = DELETE RECORDS"
210 PRINT "      3 = MODIFY RECORDS"
220 PRINT "      4 = UPDATE/PRINT CATEGORY FILE"
230 PRINT "      5 = MERGE/PRINT NEW RECORDS"
240 PRINT "      6 = PURGE DATA BANK"
250 PRINT "      7 = PRINT SUBJECT LISTING"
260 PRINT "      8 = SEARCH BY KEYWORDS"
270 PRINT "      9 = QUIT"
280 INPUT "ENTER SELECTION":MJ:PRINT
290 IF MJ<4 OR MJ>9 OR RD=1 GOTO 350
300 OPEN "D",2,"LIBCAT/DAT",68
310 FIELD 2,2 AS A2$,60 AS D2$,2 AS S2$,2 AS E2$,2 AS L2$
320 CS$= " " :RD=1:NC=0:FOR I=1 TO 80:GET 2,1:IF NC=0 AND A2$= " " THEN NC=I-1
330 CC$(I)=A2$:CD$(I)=D2$:SR$(I)=CVI(S2$):ER$(I)=CVI(E2$):LT$(I)=CVI(L2$):CS$=CS$+A2$+ " ":NW(1)=0:NEXT
I
340 IF NC=0 THEN NC=80
350 ON MJ GOTO 370,440,490,640,1130,1700,1910,2190
360 GOTO 2460
370 REM-----enter new records
380 PRINT "ENTER UP TO";100-NW;"NEW RECORDS ACCORDING TO INDICATED FORMAT.":PRINT
390 I=LOF(1)
400 I=I+1:IF NW=100 THEN PRINT "100 NEW RECORDS ENTERED AND TO BE MERGED.":PRINT:GOTO 180
410 PRINT "RECORD";I;" (ENTER / TO QUIT)":PRINT R$:"AACCCLLLLLLLLLYSSSSO";STRING$(55,"T");S$
420 LINE INPUT I$:IF I$="/" THEN PRINT:GOTO 180
430 LSET R1$=LEFT$(I$,2)+ "100"+MID$(I$,3,75):LSET N1$=MKI$(0):PUT 1,I:NW=NW+1:PRINT:GOTO 400
440 REM-----delete records
450 INPUT "ENTER RECORD NUMBER TO BE DELETED (0 TO QUIT)":I:PRINT
460 IF I=0 THEN GOTO 180
470 GET 1,I:PRINT "AAAAACCCLLLLLLLLLYSSSSO";STRING$(55,"T");R$:R1$:S$:INPUT "DELETE (Y/N)":I$:PRIN
T:IF I$="Y" THEN MID$(R1$,1,2)= " ":PUT 1,I:PRINT "RECORD";I;"DELETED.":PRINT
480 GOTO 450
490 REM-----modify records
500 INPUT "ENTER RECORD NUMBER TO BE MODIFIED (0 TO QUIT)":I:PRINT:IF I=0 THEN PRINT:GOTO 180
510 GET 1,I:PRINT "      1      2      3      4      5      6      7      8"
;".2.4.6.8.0.2.4.6.8.0.2.4.6.8.0.2.4.6.8.0.2.4.6.8.0.2.4.6.8.0.2.4.6.8.0.2.4.6.8.0.2.4.6.8.0":R$:R1$:S$:"AAAAA
CCCLLLLLLLLLLYSSSSO";STRING$(55,"T"):L$=R1$

```

```

520 INPUT "STARTING COLUMN POSITION (0 FOR REPLACEMENT TYPE OF CHANGE)";J:PRINT
530 IF J=0 THEN LINE INPUT "OLD STRING? ";J$:PRINT
540 LINE INPUT "NEW STRING? ";K$:PRINT
550 IF J>0 THEN MID$(L$,J,LEN(K$))=K$:GOTO 580
560 K=INSTR(R1$,J$):IF K=0 THEN PRINT "STRING NOT FOUND.":PRINT:GOTO 530
570 L$=LEFT$(L$,K-1)+K$+MID$(L$,K+LEN(J$),81-K-LEN(K$))
580 IF LEFT$(L$,2)=LEFT$(R1$,2) THEN GOTO 590
590 IF NM=100 THEN PRINT "ATTEMPT TO MODIFY RECORD'S CATEGORY CODE FAILS BECAUSE ALREADY 100 NEW REC
ORDS ENTERED.":PRINT:GOTO 500
600 MID$(R1$,1,2)=" ":PUT 1,I
610 MID$(L$,3,3)="100":LSET R1$=L$:K=LOF(1)+1:PUT 1,K:NM=NM+1:PRINT "OLD RECORD DELETED AND REPLACED
BY NEW RECORD";K:PRINT R$:R1$:S$:PRINT:GOTO 500
620 IF MID$(L$,3,3)<MID$(R1$,3,3) THEN PRINT "SEQUENCE NUMBER OF ACCESS CODE CANNOT BE CHANGED.":PR
INT:GOTO 500
630 LSET R1$=L$:PUT 1,I:PRINT "MODIFIED RECORD":PRINT R$:R1$:S$:"AAAAACCLLLLLLLLLYYSSSD":STRING$(
55,"T"):PRINT:GOTO 500
640 REM-----update/print category file
650 MD=0
660 PRINT "CATEGORY FILE CONTAINS";NC:"SUBJECT CATEGORIES.":PRINT
670 INPUT "WANT TO ADD, DELETE, MODIFY, RE-CREATE, PRINT CATEGORIES OR QUIT (A/D/M/R/P/B)";I$:PRINT
680 IF I$<>"A" THEN 800
690 IF NC=80 THEN PRINT "ALREADY 80 CATEGORIES. NO MORE ADDITIONS.":PRINT:GOTO 660
700 PRINT "ENTER NEW CATEGORY CODE AND DESCRIPTION ACCORDING TO INDICATED FORMAT.":PRINT
710 PRINT R$;"CC";STRING$(60,"D");S$;" (ENTER / TO QUIT)":
720 LINE INPUT J$:PRINT:IF J$="/" THEN 660
730 K$=LEFT$(J$,2):IF K$=" " THEN PRINT "NO CATEGORY CODE. RE-ENTER.":PRINT:GOTO 710
740 IF INSTR(CS$,K$)>3 THEN PRINT "DUPLICATE CATEGORY CODE. RE-ENTER.":PRINT:GOTO 710
750 FOR I=1 TO NC:IF K$<CC$(I) THEN 770
760 NEXT I:CS$=CS$+K$+" ":GOTO 790
770 FOR J=NC+1 TO I+1 STEP -1:CC$(J)=CC$(J-1):CD$(J)=CD$(J-1):SR(J)=SR(J-1):ER(J)=ER(J-1):LT(J)=LT(J
-1):NEXT J
780 CS$=LEFT$(CS$,I*3)+K$+" "+MID$(CS$,I*3+1,240-I*3)
790 CC$(I)=K$:LSET CD$(I)=MID$(J$,3,60):SR(I)=0:ER(I)=0:LT(I)=100:NC=NC+1:MD=1:GOTO 710
800 IF I$<>"D" THEN 890
810 INPUT "ENTER CATEGORY CODE TO BE DELETED (/ TO EXIT)";J$:PRINT:IF J$="/" THEN 660
820 IF INSTR(CS$,J$)<4 THEN PRINT "NO SUCH CATEGORY CODE. RE-ENTER.":PRINT:GOTO 810
830 K=(INSTR(CS$,J$)-1)\3:N=ER(K)-SR(K)+1:IF SR(K)=0 THEN 860
840 PRINT "CATEGORY CONTAINS";N:"RECORDS WHICH WILL BE DELETED AS WELL.":INPUT "DELETE (Y/N)";K$:
PRINT:IF K$="N" THEN 810
850 FOR I=SR(K) TO ER(K):GET 1,I:MID$(R1$,1,2)=" ":PUT 1,I:NEXT I
860 FOR I=K TO NC:CC$(I)=CC$(I+1):CD$(I)=CD$(I+1):SR(I)=SR(I+1):ER(I)=ER(I+1):LT(I)=LT(I+1):NEXT I
870 CS$=LEFT$(CS$,K*3)+MID$(CS$,K*3+4,240-K*3)+" "
880 CC$(I)=" ":CD$(I)=STRING$(60," "):SR(I)=0:ER(I)=0:LT(I)=100:NC=NC-1:PRINT "CATEGORY ";J$;" DELE
TED.":PRINT:MD=1:GOTO 810
890 IF I$<>"M" THEN 930
900 INPUT "ENTER CATEGORY CODE OF DESCRIPTION TO BE MODIFIED (/ TO EXIT)";J$:PRINT:IF J$="/" THEN 66
0
910 IF INSTR(CS$,J$)<4 THEN PRINT "NO SUCH CATEGORY CODE. RE-ENTER.":PRINT:GOTO 900
920 K=(INSTR(CS$,J$)-1)\3:INPUT "NEW DESCRIPTION IN QUOTES";K$:PRINT:LSET CD$(K)=K$:MD=1:GOTO 900
930 IF I$<>"R" THEN 1060
940 INPUT "DATA FILE MUST BE SORTED BY THE OLD RECORDS. READY (Y/N)";I$:PRINT:PRINT:PRINT:IF I$="Y"
THEN 950ELSE GOTO 660
950 FOR I=1 TO NC:SR(I)=0:ER(I)=0:LT(I)=100:NEXT I:J=1:L=1:K$="":SR(1)=1
960 GET 1,J:PRINT CHR$(11):CHR$(11):"SCANNING RECORD";J:PRINT:IF LEFT$(R1$,2)=" " THEN 1030
970 IF LEFT$(R1$,5)<K$ THEN PRINT "RECORD";J;"WITH ACCESS CODE ";LEFT$(R1$,5):" OUT OF SEQUENCE. D

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ATA FILE MUST BE SORTED.":PRINT:ND=0:GOTO 100ELSE K0=LEFT$(R10,5)
900 M=INSTR(CS$,LEFT$(R10,2))\3:IF M>0 THEN 1010
990 PRINT "INVALID CATEGORY CODE IN FOLLOWING RECORD:"
1000 PRINT "AAAAACCLLLLLLLLLLYSSSSO";STRING$(55,"T");R0;R10;S0:INPUT "RE-ENTER CATEGORY CODE (OR
ENTER / TO DELETE RECORDS)";I0:PRINT:PRINT:IF I0="/" THEN MID$(R10,1,2)=" ":GOTO 1030ELSE MID$(R10,1
,2)=I0:GOTO 970
1010 IF M\3 THEN ER(L)=J-1:SR(M)=J:L=M
1020 LT(M)=VAL(MID$(R10,3,3))
1030 IF J=LR THEN ER(M)=J:LSET N10=MKI0(8899):PUT 1,J:GOTO 1050
1040 LSET N10=MKI0(J+1):PUT 1,J:J=J+1:GOTO 980
1050 PRINT "CATEGORY FILE RE-CREATED AND DATA FILE UPDATED.":PRINT:ND=1:GOTO 660
1060 IF I0<>"P" THEN 1110
1070 LPRINT:LPRINT:LPRINT:LPRINT TAB(37) "HALTOM REGION PLANNING LIBRAR
Y":LPRINT:LPRINT:LPRINT TAB(43) "SUBJECT CATEGORY LISTING":LPRINT:LPRINT:LPRIN
T TAB(58) "(AS OF ":DT0:")"
1080 LPRINT:LPRINT:LPRINT:LPRINT TAB(89) "START END LAST":LPRINT TAB(19) "CODE":SPC(27):"DE
SCRIPTION":SPC(28):"REC # REC # SER # USED":LPRINT TAB(19) "——":STRING$(60,"-"): "——
——":LPRINT
1090 LN=38:FOR I=1 TO NC:IF LN=0 THEN SYSTEM "T":LN=55
1100 LPRINT TAB(20):CC$(I): " ":CD$(I):LPRINT USING " #### #### ###":SR(I):ER(I):LT(I
):LN=LN-1:NEXT I:SYSTEM "T":PRINT "CATEGORY LISTING PRINTED.":PRINT:GOTO 660
1110 IF ND>0 THEN GOSUB 2490
1120 PRINT "CATEGORY FILE CONTAINS":NC:"SUBJECT CATEGORIES.":PRINT:GOTO 180
1130 REM——merge/print new records
1140 IF NW=0 THEN PRINT "NO NEW RECORDS.":PRINT:GOTO 180
1150 PRINT "READING IN NEW RECORDS.....":PRINT:PRINT
1160 FOR I=1 TO NW:GET 1,LR+I
1170 J=INSTR(CS$,LEFT$(R10,2))
1180 IF J>0 THEN 1210
1190 PRINT:PRINT "INVALID CATEGORY CODE IN FOLLOWING RECORD.":PRINT "AAAAACCLLLLLLLLLLYSSSSO";STR
ING$(55,"T");R0;R10;S0:INPUT "RE-ENTER CATEGORY CODE (OR ENTER / TO DELETE RECORD)";K0:PRINT:PRINT:IF
K0="/" THEN K0=" "
1200 MID$(R10,1,2)=K0:GOTO 1170
1210 IF J>1 THEN M=(J-1)\3:NN(M)=NN(M)+1:LT(M)=LT(M)+1:MID$(R10,3,3)=RIGHT$(STR$(LT(M)),3)
1220 RR$(I)=R10:PRINT CHR$(11): " ":I:" RECORDS READ.":NEXT I:PRINT
1230 ST=0:JP=NN:PRINT "SORTING":NW:"NEW RECORDS BY CATEGORY CODE....."
1240 ST=ST+1:JP=JP\2:PS=0:SM=0:IF JP<1 THEN 1320
1250 FOR I=1 TO JP
1260 SI=0:PS=PS+1:J=I
1270 K=J+JP:IF K>NW THEN 1300
1280 IF RR$(J)>RR$(K) THEN SWAP RR$(J),RR$(K):SM=SM+1:SI=1
1290 J=K:GOTO 1270
1300 IF SI>0 THEN J=I:GOTO 1260
1310 NEXT I:PRINT USING " SORT ### (EVERY ## ITEMS)—## PASSES ## SWAPS":ST:JP:PS:SM:GOTO 1240
1320 PRINT "SORTING COMPLETED.":PRINT
1330 PRINT "MERGING NEW RECORDS.....":PRINT:PRINT
1340 FOR I=1 TO NW:J0=LEFT$(RR$(I),2):K=(INSTR(CS$,J0)-1)\3:IF K=0 THEN K=1
1350 IF SR(K)>0 THEN GET 1,ER(K):L0=N10:LSET N10=MKI0(LR+I):PUT 1,ER(K):ER(K)=LR+I:LSET R10=RR$(I):
LSET N10=L0:PUT 1,LR+I:GOTO 1420
1360 SR(K)=LR+I:ER(K)=LR+I
1370 FOR M=K-1 TO 1 STEP -1:IF SR(M)>0 THEN GET 1,ER(M):L0=N10:LSET N10=MKI0(LR+I):PUT 1,ER(M):LSET
R10=RR$(I):LSET N10=L0:PUT 1,LR+I:GOTO 1420
1380 NEXT M
1390 FOR M=K+1 TO NC:IF SR(M)>0 THEN LSET R10=RR$(I):LSET N10=MKI0(SR(M)):PUT 1,LR+I:GOTO 1420
1400 NEXT M

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1410 LSET R1$=RR$(I):LSET N1$=NK$(9999):PUT 1,LR+I
1420 PRINT CHR$(11);"    ":" RECORDS MERGED." :NEXT I:PRINT:GOSUB 2490:LR=LOF(1):NM=NM:NM=0
1430 INPUT "WANT A PRINT OF NEWLY MERGED RECORDS (Y/N)":"I$=PRINT:IF I$="N" THEN 1550
1440 TT$="HALTON REGION PLANNING LIBRARY—RECENT ADDITIONS":PW=0:LN=55:J$=" "
1450 FOR I=1 TO NM:K$=RR$(I):IF LEFT$(K$,2)=" " THEN 1540
1460 IF LEFT$(K$,2)=J$ THEN 1530
1470 IF LNK7 THEN GOSUB 2520
1480 IF LN=55 THEN GOSUB 2580
1490 IF LNK49 THEN LPRINT:LN=LN-1
1500 L$=CD$((INSTR(CS$,LEFT$(K$,2))-1)\3):IF INSTR(L$," ")>0 THEN N$=LEFT$(L$,INSTR(L$," ")-1)
1510 IF RIGHT$(N$,1)=" " THEN N$=LEFT$(N$,LEN(N$)-1)
1520 LPRINT TAB(12) N$:STRING$(110-LEN(N$),"."):LPRINT:J$=LEFT$(K$,2):LN=LN-2
1530 N=LR-NM+I:GOSUB 2650
1540 NEXT I:GOSUB 2520:PRINT "LIST OF NEW RECORDS PRINTED.":PRINT
1550 INPUT "WANT LABELS OF NEW RECORDS (Y/N)":"I$=PRINT:IF I$="N" THEN 180
1560 INPUT "ENTER NUMBER OF LABELS/LINE, LABEL WIDTH (IN UNITS OF 1/10 INCH) AND LABEL HEIGHT (IN UNITS OF 1/6 INCH)":"LL,LM,LH:PRINT:L$=SPACE$(LM-5):TL=0:ML=60\LH
1570 INPUT "POSITION PRINTER HEAD. WANT A TEST RUN OF 2 LINES (Y/N)":"I$=PRINT:IF I$="N" THEN 1610
1580 FOR I=1 TO 2:FOR J=1 TO LL:LPRINT "XXXXX":L$;:NEXT J
1590 FOR J=1 TO LH:LPRINT:NEXT J
1600 NEXT I:ML=ML-2:GOTO 1570
1610 PRINT "ENTER NUMBER OF LINES (UP TO):ML::INPUT "LINES) TO BE PRINTED ON THIS PAGE":LP:PRINT:OT=TL
1620 FOR I=1 TO LP:FOR J=1 TO LL:TL=TL+1:IF TL>NM THEN SYSTEM "T":ML=60\LH:GOTO 1670
1630 IF LEFT$(RR$(TL),2)=" " THEN J=J-1:GOTO 1640ELSE LPRINT LEFT$(RR$(TL),5):L$;
1640 NEXT J
1650 FOR J=1 TO LH:LPRINT:NEXT J
1660 NEXT I:SYSTEM "T":ML=60\LH
1670 INPUT "WANT TO RE-PRINT THIS PAGE (Y/N)":"I$=PRINT:IF I$="Y" THEN TL=OT ELSE IF TL>NM THEN 1590
1680 GOTO 1570
1690 PRINT "LABELS PRINTED.":PRINT:GOTO 180
1700 REM——purge data bank
1710 INPUT "INSERT DISKETTE WITH SUFFICIENT STORAGE SPACE IN DRIVE 1. READY (Y/N)":"I$=PRINT:PRINT:P
1720 OPEN "D",3,"LDATA1/DAT:1",82
1730 FIELD 3,80 AS R3$,2 AS N3$
1740 FOR I=1 TO NC:IF SR(I)>0 THEN J=SR(I):GOTO 1760
1750 NEXT I
1760 FOR I=1 TO NC:SR(I)=0:ER(I)=0:LT(I)=100:NEXT I:K=0:L=0:N=0:J$="":K$=" "
1770 GET 1,J:N=N+1:PRINT CHR$(11);CHR$(11);"PROCESSING OLD RECORD":J;"WITH":N;"OLD RECORDS READ AND":L;"NEW RECORDS STORED. " :PRINT:IF LEFT$(R1$,2)=" " THEN 1850
1780 IF LEFT$(R1$,5)<K$ THEN PRINT "OLD RECORD":J;"WITH ACCESS CODE ":LEFT$(R1$,5);" OUT OF SEQUENC
E. PURGE ABORTED.":PRINT:RD=0:GOTO 180ELSE K$=LEFT$(R1$,5)
1790 K=K+1:R1$(K)=R1$:IF K<100 AND CVI(N1$)<9999 THEN 1850
1800 FOR I=1 TO K:N=INSTR(CS$,LEFT$(RR$(I),2))\3:IF LEFT$(RR$(I),2)=LEFT$(J$,2) THEN 1830
1810 IF L>0 THEN ER(INSTR(CS$,LEFT$(J$,2))\3)=L
1820 SR(N)=L+1:J$=LEFT$(RR$(I),5)
1830 LT(N)=VAL(MID$(RR$(I),3,3)):L=L+1:LSET R3$=RR$(I):LSET N3$=MK$(L+1):PUT 3,L:PRINT CHR$(11);CH
R$(11);"PROCESSING OLD RECORD":J;"WITH":N;"OLD RECORDS READ AND":L;"NEW RECORDS STORED. " :PRINT
1840 NEXT I:K=0:IF CVI(N1$)=9999 THEN ER(INSTR(CS$,LEFT$(J$,2))\3)=L:LSET N3$=MK$(9999):PUT 3,L:GOT
O 1860
1850 J=CVI(N1$):GOTO 1770
1860 IF NM=0 THEN 1890
1870 FOR I=1 TO NM:J=LR+I:GET 1,LR+I:N=N+1:IF LEFT$(R1$,2)=" " THEN 1880ELSE L=L+1:LSET R3$=R1$:LSE
T N3$=N1$:PUT 3,L:PRINT CHR$(11);CHR$(11);"PROCESSING OLD RECORD":J;"WITH":N;"OLD RECORDS READ AND":

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L:"NEW RECORDS STORED. ":PRINT
1880 NEXT I
1890 CLOSE Z:OPEN "D",Z,"LIBCAT1/DAT:1",88:GOSUB 2480
1900 PRINT "NEW DATA FILE STORED AS LDATA1/DAT AND NEW CATEGORY FILE AS LIBCAT1/DAT ON":PRINT "DISKETTE IN DRIVE 1. COPY OR RE-NAME THESE NEW FILES AS LDATA/DAT AND":PRINT "LIBCAT/DAT BEFORE RE-STARTING PROGRAMME.":PRINT:GOTO 2460
1910 REM——print subject listings
1920 TT$="WALTON REGION PLANNING LIBRARY—SUBJECT LISTING":LN=55
1930 FOR I=1 TO NC:IF SR(I)>0 THEN BJ=SR(I):GOTO 1950
1940 NEXT I
1950 INPUT "RESUME AN INTERRUPTED LISTING (Y/N)":I$;PRINT:IF I$="N" THEN PN=0:LP=0:J$="A":SC=1:GOTO 2020
1960 INPUT "ENTER LAST PAGE NUMBER AND LAST RECORD NUMBER PRINTED":PN,LP:PRINT:GET 1,LP:J$=LEFT$(R1$,1)
1970 SJ=CVI(N1$):IF SJ=9999 THEN SC=NC:GOTO 2000
1980 GET 1,SJ:IF LEFT$(R1$,2)=" " THEN 1970
1990 SC=INSTR(CS$,LEFT$(R1$,2))\3
2000 INPUT "IS THE LAST RECORD PRINTED IN A CROSS-REFERENCE BLOCK (Y/N)":M$;PRINT:IF M$="N" THEN 2020
2010 INPUT "WHAT IS THE CROSS-REFERENCE SUBJECT CODE":J$;PRINT:SC=INSTR(CS$,LEFT$(J$,1)+"Z")\3+1
2020 FOR I=SC TO NC+1:IF I=NC+1 THEN GOSUB 2520:GOTO 2110
2030 IF J$<LEFT$(CC$(I),1) THEN GOSUB 2520:GOTO 2110
2040 IF SR(I)=0 THEN 2180
2050 L$=CD$(I):IF INSTR(L$, " ")>0 THEN ST$=LEFT$(L$,INSTR(L$, " ")-1)
2060 IF RIGHT$(ST$,1)=" " THEN ST$=LEFT$(ST$,LEN(ST$)-1)
2070 GOSUB 2580
2080 J=SR(I):IF LP>0 THEN J=SJ
2090 GET 1,J:K$=R1$:N=J:IF LEFT$(R1$,2)<>" " THEN GOSUB 2630
2100 IF J=ER(I) THEN 2180ELSE J=CVI(N1$):LP=0:GOTO 2090
2110 PT=0:J=BJ:IF LP>0 AND M$="Y" THEN J=SJ
2120 GET 1,J:IF LEFT$(R1$,1)=J$ OR INSTR(MID$(R1$,6,3),J$)=0 THEN 2160
2130 IF PT=1 THEN 2150
2140 ST$=LEFT$(CD$(I-1),INSTR(CD$(I-1),"--")+1)+"CROSS REFERENCE":PT=1:GOSUB 2580
2150 K$=R1$:N=J:IF LEFT$(R1$,2)<>" " THEN GOSUB 2630
2160 J=CVI(N1$):IF J<9999 THEN LP=0:GOTO 2120
2170 IF I<NC+1 THEN J$=LEFT$(CC$(I),1):GOTO 2040
2180 NEXT I:GOSUB 2520:PRINT "SUBJECT LISTING PRINTED.":PRINT:GOTO 180
2190 REM——search by keyword
2200 PRINT "ENTER UP TO 5 SEARCH STRINGS SEPARATED BY / (ENTER // TO QUIT)?":LINE INPUT SS$:PRINT:IF SS$="//" THEN 180
2210 J$=SS$+ "/" :FOR I=1 TO 5:RR$(I)=LEFT$(J$,INSTR(J$,"/")-1):J$=RIGHT$(J$,LEN(J$)-LEN(RR$(I))-1):IF J$="" OR I=5 THEN ST=I:GOTO 2230
2220 NEXT I
2230 INPUT "SEARCH FROM BEGINNING OF DATA FILE (Y/N)":I$;PRINT:IF I$="Y" THEN BC=1:GOTO 2250
2240 INPUT "ENTER STARTING CATEGORY CODE FOR THE SEARCH":I$;PRINT:BC=INSTR(CS$,I$)\3:IF BC=0 THEN PRINT "INVALID CATEGORY CODE.":PRINT:GOTO 2240
2250 FOR I=BC TO NC:IF SR(I)>0 THEN BI=SR(I):GOTO 2270
2260 NEXT I
2270 INPUT "DISPLAY OR PRINT SEARCHED RECORDS (D/P)":DP$:PRINT
2280 PRINT "SEARCH BEGINS.....(TO INTERRUPT, HOLD DOWN ANY KEY)":PRINT
2290 IF DP$="D" THEN PRINT "FOLLOWING RECORDS IDENTIFIED.":PRINT " (* LARGE-SIZE DOCUMENT 0 COL MCILLORS' LIBRARY)":PRINT:PRINT:PRINT
2300 TT$="WRPL—LISTING OF "+SS$+" DOCUMENTS":PN=0:LN=55:SC=0:PT=0:I=BI:J=0
2310 GET 1,I:J=J+1:IF LEFT$(R1$,2)=" " THEN 2430ELSE PRINT CHR$(11);CHR$(11);".....SCANNING RECORD":I:"CATEGORY ":LEFT$(R1$,2):" AND ":J:" RECORDS SCANNED ":PRINT:IF INKEY<>" " THEN 2420

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10 REM——ZSORT/SAS——written by h k wong——version 3——82 08 04
20 REM——this programme sorts records of a data file
30 REM——programme adjustment needed: insert record length in lines 90,130,
40 REM——140,380,390
50 REM——initialize
60 CLEAR 26000
70 CLS
80 DEFINT A-Z
90 SZ=26000/(82+1):DIM RR$(SZ)
100 PRINT "=== SORT PROGRAMME ===":PRINT:PRINT
110 REM——read in input file name and sorting range
120 INPUT "ENTER INPUT FILE NAME";IP$:PRINT
130 OPEN "D",1,IP$,62
140 FIELD 1, 82 AS R1$
150 PRINT "FILE CONTAINS";LCF(1);"RECORDS AND PROGRAMME CAN SORT UP TO";SZ;"RECORDS.":PRINT
160 INPUT "ENTER RANGE OF RECORDS TO BE SORTED";IB,IE:PRINT
170 REM——read data records into memory
180 PRINT:PRINT:NS=IE-IB+1
190 FOR I=IB TO IE:II=I-IB+1
200 PRINT CHR$(11);CHR$(11);"READING IN RECORD";II;"OF";NS;"RECORDS.....":PRINT
210 GET 1,I
220 RR$(II)=R1$
230 NEXT I
240 PRINT "READING COMPLETED.":PRINT
250 REM——perform sorting
260 ST=0:JP=NS:PRINT "SORTING";NS;"RECORDS....."
270 ST=ST+1:JP=JP\2:PS=0:SW=0:IF JP<1 THEN 350
280 FOR I=1 TO JP
290 SI=0:PS=PS+1:J=I
300 K=J+JP:IF K>NS THEN 330
310 IF RR$(J)>RR$(K) THEN SWAP RR$(J),RR$(K):SW=SW+1:SI=1
320 J=K:GOTO 300
330 IF SI>0 THEN J=I:GOTO 290
340 NEXT I:PRINT USING " SORT ### (EVERY ### ITEMS)——### PASSES ### SWAPS";ST:JP:PS:SW:GOTO 270
350 PRINT "SORTING COMPLETED.":PRINT
360 REM——read in output file name and storing sorted records
370 INPUT "ENTER OUTPUT FILE NAME";OP$:PRINT:PRINT:PRINT
380 OPEN "D",2,OP$,82
390 FIELD 2,82 AS R2$
400 FOR I=1 TO NS
410 PRINT CHR$(11);CHR$(11);"STORING RECORD";I;"OF";NS;"RECORDS.....":PRINT
420 LSET R2$=RR$(I)
430 PUT 2,I
440 NEXT I
450 CLOSE 2
460 PRINT "STORING COMPLETED.":PRINT
470 REM——test for another sort
480 INPUT "WANT ANOTHER SORT (Y/N)";A$:PRINT:IF A$="Y" THEN INPUT "SAME INPUT FILE (Y/N)";A$:PRINT E
LSE GOTO 520
490 IF A$<>"Y" THEN CLOSE 1:GOTO 120
500 FOR I=1 TO SZ:RR$(I)="":NEXT I:GOTO 150
510 END
520 CLOSE
530 END

```

```

10 REM——ZMERGE/BAS——written by h k wong——version 2——82 08 04
20 REM——this programme merges two sorted data files
30 REM——programme adjustment needed: insert record length into lines 130,140.
40 REM—— 150,160,200,210
50 REM——initialize
60 CLEAR 1000
70 CLS
80 DEFINT A-Z
90 DIM LF(2),BF(2),FL$(2)
100 PRINT "+++ MERGE PROGRAMME +++":PRINT:PRINT
110 REM——read in input and output file names
120 INPUT "ENTER THE TWO INPUT DATA FILES TO BE MERGED":FL$(1),FL$(2):PRINT
130 OPEN "D",1,FL$(1),82
140 FIELD 1,82 AS R1$
150 OPEN "D",2,FL$(2),82
160 FIELD 2,82 AS R2$
170 LF(1)=LOF(1):LF(2)=LOF(2)
180 PRINT "FILE ";FL$(1);" CONTAINS";LF(1);"RECORDS.":PRINT "FILE ";FL$(2);" CONTAINS";LF(2);"RECORD
S.":PRINT
190 INPUT "ENTER OUTPUT FILE NAME":FO$:PRINT
200 OPEN "D",3,FO$,82
210 FIELD 3,82 AS R3$
220 REM——merging records
230 PRINT "MERGING FILES.....":PRINT:PRINT LOF(1)+LOF(2);"RECORDS TO BE MERGED.":PRINT:PRINT:PRINT
240 GET 1,1:BF(1)=R1$:GET 2,1:BF(2)=R2$:K=0:J=0
250 J=J+1:IF K=2 THEN 350
260 I=1:IF BF(1)>BF(2) THEN I=2
270 LSET R3$=BF(I):PUT 3,J:PRINT CHR$(11);CHR$(11);"STORING RECORD";J;"FROM FILE";I;".....":PRINT
280 IF LOC(I)=LF(I) THEN K=K+1:BF(I)=STRING$(255,""):GOTO 250
290 IF I=2 THEN 320
300 GET 1:IF R1$<BF(1) THEN 340
310 BF(1)=R1$:GOTO 250
320 GET 2:IF R2$<BF(2) THEN 340
330 BF(2)=R2$:GOTO 250
340 PRINT:PRINT "FILE ";FL$(1);" OUT OF SORT AT RECORD";LOC(1);"AND PROGRAMME TERMINATED.":PRINT:GOT
0 380
350 PRINT "MERGING COMPLETED.":PRINT
360 CLOSE
370 REM——test for another merge
380 INPUT "WANT ANOTHER MERGE (Y/N)":A$:PRINT:IF A$="Y" THEN 120
390 END

```

